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then presents for the distance is ^{top as} bare & evenly, -
you get long straight fells, with level as the
topping of a wall, & steep unbroken sides, when,
as in Scaresden Pass, above Kettlewell, you are
shut in between two opposing steep fells,
it is as if you were imprisoned between colossal
walls.

Kilnsey Crag, by Arncliffe in Wharfedale, the
Scars of Giggleswick near Settle, in Ribblesdale
& Malham Cove, & Gordale Scar in northern
Airedale, are very fine examples of limestone scars.
The two last, indeed, present some of the finest
rock scenery in England. ^{Gordale Scar has the appearance of a} Malham Cove ^{forming a perfect picture.}
presents ~~to the eye the appearance of~~ a great section
of a vast amphitheatre, with projecting
cornices which may represent tiers of seats.
Some 200 feet in height. At the foot of the
cliff is a low arch, the mouth of a cave, from
this cave issues a clear stream, the infant
Aire. But this is not the original source of
the river: above the Cove, on the great limestone
plateau of Malham, is a Malham Tarn, & from
this Tarn issues a stream, which flows some
half a mile above ground; then, makes its escape
through fissures in the rock, eats out a way for
itself through the bowels of the plateau, is increased
by other underground streams, & comes to
light again, as we have seen, at the foot of
Malham Cove.

Now we have an example of the history of
cave-making: flowing water sinks through
the pressure of the rock, then, partly by erosion,
partly by dissolution of the rock substance,
enlarges

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of the greatest unmet thriving seats of industry in
the empire.

The great coal field reaches down into Nottingham
but our concern is with that part of it which lies
within Yorkshire. A strip of the Lower Coal Measures
upon which stand Leeds, Bradford, Halifax,
Huddersfield, borders the Central mass of the
'Middle Coal Measures', whereon are Wakefield,
Barnsley, Sheppfield, Rotherham.

Perhaps the best known coals of the Lower Coal
Measures in Yorkshire are, the Better Red Coal
of Bradford, a bright coal, very free from sulphur,
used in working the Low Moor Ironstone.

The latter exists in layers, never more than
two feet in thickness, far above the Coal
seams, ^{Low Moor iron} & owes its celebrity for superior
longthness as much to the excellence of the
Better Red Coal employed in smelting & refining
it as to the qualities of the Ironstone. The
Buxton Red near Leeds is another valuable
bed, the seams having the unusual thickness
of six feet in some places.

Of the Middle Coal Measures, so called as being
less deeply buried than the Lower measures,
perhaps the most valuable seam is the
Lithstone coal, reaching from the southern
boundary of the country as far north as ^{Carlton}
above Barnsley. The seam has a thickness
of some four or half feet, though it is divided
into two beds by a layer of sand & clay, a
few inches thick. This is excellent household
coal, and great deal of it is sent to London.
This is succeeded to the north by the Blackburn
Coal.

Coal, a seam at about the same level as the Tullahoma
but of poorer quality, which reaches northward nearly
to Leeds. At a much higher level is the celebrated
Barnesley Bed, the most prolific in Yorkshire.
A seam more or less feet in thickness in the
neighbourhood of Barnesley & but thinning
out beyond Cheppids to some four or five feet.
A ^{thin} ~~well~~ ^{hard} soft-top & bottom layers such
found household coal, while the finer, closer
centred portions supply steam-making coal.

We come now to the question, under what conditions were these coal beds laid down - the deeply bed foundation of the progressing - of the west-rising? We must carry our imagination back to a period which we can only describe as many millions of years ago. So many changes have taken place in the interval, that, were the coal measures in ~~position~~ ^{situ} they would lie at a depth of fifty - thousand feet, that is, they would be utterly imperceptible out-crops. But - throughout the long geologic periods which have elapsed since the laying down of the coal, the crust of the earth has ~~been~~ undergone many plutonic upheavals, causing cracks or 'faults' in the solid strata above. Thus the coal has been brought just to the surface, at any rate within measurable & workable distances.

This black rock is basalt unique: it is the only rock projectable in which forms any considerable part of the earth's crust. This is, roughly, its history:— We have seen that that area including the centre of the British Isles, which we have spoken of as occupied by an inland sea, was subject to alternate eras of elevation

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as dry land submergence as the bed of a
sea or lake. But in to say, the sandy bottom was
probably always either rising very very gradually,
or sinking or gradually, then it had been
above the water level it was dry land, when
it had sunk below that level, it was the bottom
of sea. Each such change was the work of ages.
Now, during each of these periods, elevations, which
brought soil upon the sandy bottoms, & forests grew
upon them. Not such forests as grow in the
same latitudes now: the conditions were different.
The climate & soil were perhaps not unlike
those of the swamps which fringe the southern
states of ~~North America~~ bordering on the Gulf
of Mexico. In equable temperature, humid
atmosphere which soil favoured
rank tropical vegetation, of the material from
the mosses & forest trees for the most part
but developed into forest trees some only
feet high. Sepidodendron, Sigillaria
& Calamites, together with the ferns, &
thick underwood of lesser plants, & soft
of pine on the higher levels. Now these forests
decayed, very slowly submerged, were
compressed ^{by} the earliest of hydrostatic
pressures, the weight of the sea above them,
how these forests were overlain by a new
sandy sea-bottom, which went through the
same history of gradual elevation, by green plants
now ever increasing thickness, then, predomining
them, submergence, as the last, how this was
repeated again & again, how often, we have some
no means of judging, not only a hundred
different seams of coal, each divided by the
under

it is worth while to consider the character of this limestone stratum.

The Swale Str. & Deep. Ais & Ribbles have all cut much of their upper valleys out of the solid limestone, & their upper courses give opportunity to study the characteristics of limestone country. Upper Wharfedale, ^{from above} ~~between~~ Burnesall & Deepdale, is, perhaps, the most beautiful & the most characteristic of these valleys. Like the Lee, the Wharfe is -

"Condemned to mine a channel & way
For solid sheets of marble grey," -

& the clear brown waters, brown from the peat-mosses where they rise, courses through a clean swept-channel, ^{of} grey slabs. Every now & then, enormous boulders break the current, slowing the waters into pools; where, the peat has left the rock is set off by draperies of the richest-darkest mosses. Alders hang over the streams a little higher are hazel thickets - with birch & rowan for variety; & in the thickets of the limestone hills above, the cold grey-green of the ash is the prevailing tint. A special feature of this limestone country is the lovely lawn-like meadow & pastures which fill the lower valley; lawn-like that is, after the first & second cutting of the hay, but lovely always, for it is the property of the limestone when a close, short, vividly green turf. greener & brighter than the delicious turf of the chalk, though less fine & elastic. The flowers are very abundant & lovely; the handsome ^{purple} ^{or} ^{white} ^{per}

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regions presenting very different landscapes
smackings very different geological conditions.
Now, following still the order of time, & beginning at
the North, we have, first, the North eastern Moorlands,
with vegetation not very unlike that of the
Western Moorlands, though supported on rocks
of far more recent origin.

Going south, we cross the Vale of Pickering.
~~Full of verdure & fertility~~ verdant & fertile its
surface rock being the boulder clay of glacial
origin.

Next succeeds the chalk of the Wolds, & lastly
Holderness, consisting of recent deposits,

the debris of the rest of the country.
So intimately is the landscape, & therefore the
agricultural & manufacturing industries of
a district connected with its geological formation
that Yorkshire may be roughly parcelled out into
some six or seven series of landscapes
corresponding with the geological structural divisions
we have indicated.

The Silurian rocks, infinitely the oldest series
which Yorkshire exhibits, appears only in one
or two places. You are surprised to come
upon quarries of bluish-green slates in
the neighbourhood of Ingleton, & again, to
the north of Sedburgh. The same hard rocks
appear. How far the Silurian rocks underlie
the limestone we need not inquire here;

but the landscape & industries of northern
Yorkshire depend so largely on the Carboniferous
Series, that we must give a more detailed account
of these.

In remote geologic times, a landlocked sea
occupied the centre of the space now occupied by
the

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The British Isles - a sea with many shells, fish, corals, graminiferous, multistudious marine animals which pressed their shells in harder parts of the carbonates of lime which the rivers falling into this sea constantly brought-down in solution. As countless generations of these marine creatures died, the hard fragments they had secreted fell to the bed of the sea. In the course of ages, this perpetually increasing deposit of limestone nearly choked the sea, & nowonder for in the Craven district, this accumulation of the ~~remains~~^{remains} of marine animals reaches a thickness of 500 or 600 feet; while in Derbyshire, which was also included in the bottom of this ancient-sea, a depth of 5000 feet has been measured. Here we have the origin of the Mountain, a Carboniferous limestone which forms a district of singular beauty & peculiar character in the north-west of the County. You may often see that the limestone is simply a mass of shells, corals, encrinurus, &c. but more commonly, the shells are so broken or so small that the combined mass looks like a ^{compact} whitey-grey stone rock. The gradual elevation & hardening into dry land of this sea-bottom is a process we can conceive of. But, how is it that this enormously thick solid floor of limestone we have spoken of should not be coextensive with the ancient-sea where it was laid, should not ^{in probability, for instance} extend far ~~to the south-east~~ ^{over the area of the County} instead of being confined to the north-west? It does extend in this manner, but in the south-east, it is buried under an enormous depth of more recent deposits. How these deposits were laid, we may consider later, but in the meantime,